

## DIARY OF A HIBERNATING BUTTERFLY.

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Doubtless in acknowledgment of the honor just conferred upon it by giving it a new and euphonious name in my "Butterflies of the Eastern United States," a fine specimen of *Euvanessa antiopa* came to pass the winter with me, taking up its station in the cellar directly beneath the room where the Cambridge Entomological Club holds its meetings. It was first noticed about the middle of November, before the cellar windows had been closed for the winter. It was then pitched on the top of the cellar-wall where this was exposed in the passage-way down stairs. For fear of its falling a prey to the mice which had been seen here, it was driven away, when it at once took up its station about eight inches above the cellar floor on the "riser" of the first stair, just beneath the projecting edge of the first "tread," the extremity of its wing projecting beyond the tread. Here it remained all winter, until the last days of February, not, however, without moving; the position of the wings was marked with a pencil on the edge of the tread, and it was found to have shifted its position repeatedly — some six or eight times — sometimes forward, sometimes backward, within a range of about an inch; about the middle of January its position changed from perfectly horizontal to slightly oblique, the head

downward, and on the very morning of the day it left the station it was noticed to have shifted a very little more, increasing its obliquity. During all this time the wings were kept in an identical position, back to back, the fore wing thrust forward just so much as to bring the tooth at the tip of the lower median nervule of the fore wing exactly midway between the subcostal tooth of the same wing and the tooth of the upper median nervule of the hind wing. This is exactly the position of complete repose in summer. The station chosen was a curious one, being *directly* beneath the spot where the right foot, always first advanced, was placed upon the first tread, and a movement of air must at least have been perceptible to it whenever one went upstairs or down, but in only a single instance was any apparent agitation produced; this was when the cellar doors ten feet away from it were opened, on a tolerably cool day, and for three hours men were passing back and forth bringing in wood; then a slight vibration of the wing-tips was seen, but no sound could be detected.

In a wintering *Polygonia* observed by Goossens in Paris, the fore wings responded to the warmth of the weather by creeping forward and backward between the hind wings a very little, with-

out any other noticeable movement. This I was unable to detect in *E. antiopa*, perhaps because the cellar temperature would not vary nearly so much as the outer air, especially as it contained a furnace at about twenty-five feet distance; but particular attention was paid on the coldest and warmest days without detecting any difference of position of the wings. What the cause of the slight forward and backward movements might be was not discovered; it seemed to have no relation to the weather or to the amount of light. It may be added that until the position became oblique the wings were held horizontally with a scarcely perceptible tip upward toward the "tread," the legs on the upper side being bent slightly more than those on the lower side; but when the oblique shift was made, the tip was very slightly increased, to about ten degrees in all.

It finally flew to a small window about six feet above its hibernating post, where it was found at about 2 P. M. on 28 February, having left its winter quarters since 1 P. M. It was in a curious position: it had evidently alighted on the vertical surface of the lower sash, head upward, and had lost its hold, the smoother surface not permitting its claws to hold so well as in its hibernating station, and had fallen backward upon the top of the ledge an inch or two beneath, and there remained upside down, balanced on the top of its erect wings, the margins of the hind pair spreading by the weight and so prevent-

ing it from tipping over; in this strange position, feet upward, where a mere breath of air would have thrown it over, but from which it could free itself only by flapping its wings, it remained for more than an hour, but by about 3 P. M. was found to have righted itself and pitched with erect wings, head downward, on the cellar wall a few inches away.

February 28 was a cloudy, cool day with rain, the thermometer at the time of its flight about  $42^{\circ}$ . In the cellar it was about  $48^{\circ}$ – $50^{\circ}$ . The only time that the outer air had free access since the closing of the windows late in November was when the wood was brought in early in February.

The butterfly remained in the position it had taken on the afternoon of 28 February until about noon of 5 March. During the warmer days when the rays of the sun fell directly on the apical half of the wings, it would thrust its antennae forward at an angle of about  $45^{\circ}$  with each other and at an angle with the costal edge of the fore wings of about  $35^{\circ}$ ; at other times the antennae were kept between the fore wings out of sight, just behind the costal margin, as I found out by parting the wing-tips carefully without in the least disturbing it. It shifted its position slightly from day to day much as it had done on the stair, but retained practically the same foothold with which it had alighted. I had to pass the place more than a dozen times a day, my shoulder within a foot of the butterfly, but the only effect

shown was when the antennae were extended as if alert. Then my presence near at hand or my passing would be recognized by a rocking or bowing motion of all the wings in common, produced, apparently, by the action of the middle legs in lowering and raising the body upon the pivot formed by the insertion of the hind legs; the tips of the wings moved slowly forward and backward, the forward motion more abrupt than the backward, over an arc of not more than a quarter of a centimetre; the motion was accompanied by no perceptible sound.

On the 5th, a bright, warm day, the butterfly had turned back to the window at about noon, and my appearance led to some fluttering against the pane. As I remained motionless, it gained heart, walked about the broad ledge beneath the window with open wings and antennae spread at right angles, with every few steps depressing them like stiff sticks till they touched the ground, beating time, as it were, with its march, and, finally, took up its position on the ledge, and turning its back to the sun, expanded its wings fully, even depressing them so that the tips touched the surface of rest; the antennae retained the alert position of the day before.

Wishing to see what would happen I moved from my position directly opposite the window, my head about three feet away, toward the butterfly, but as slowly as possible. No effect was produced until my eyes were within a foot of the butterfly facing me, when its wings shut with a snap and then began to vibrate; the tips of the wings appeared to have a lateral vibration of not more, probably considerably less, than a couple of millimetres, while the antennae vibrated forward and backward as much as laterally, and not over a millimetre. I could perceive no sound whatever. I slowly turned my head to bring my ear opposite, but could still detect nothing. On endeavoring to bring my ear still nearer by the quietest possible approach, the butterfly flew again to the window and fluttered about. Subsequently, I got within six inches and could then distinctly hear a rustle like the flapping of the wings of an insect against a window pane at a distance, and could see that there was not the slightest motion of the fore wing on the hind. It afterwards partook so greedily of some half-rotten apple offered it that it permitted me to hustle it about with my finger without apparent fright.

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